

PATENT ABSTRACTS OF JAPAN

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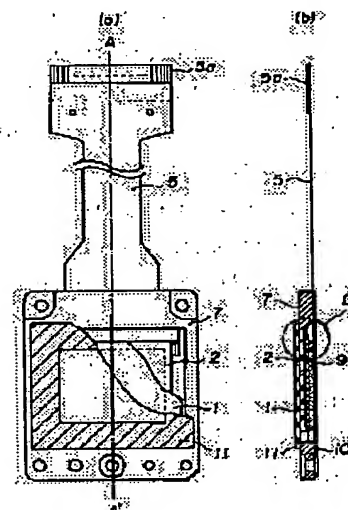
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(54) LIQUID CRYSTAL DISPLAY ELEMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain the liquid crystal display element which has high reliability by improving the shock resistance and moisture resistance.

SOLUTION: This element has a liquid crystal panel, constituted by sandwiching a liquid crystal layer (3) in the opposition gap between a common electrode formed on a 1st substrate and a drive electrode formed on a 2nd substrate 2, a package 7 formed of a frame member constituting a cavity part where the liquid crystal panel is stored and held, and a flexible printed board 5, which is connected to the common electrode and drive electrode on one side of the liquid crystal panel and has the other end free and supplies a signal voltage for image display. A light shield frame 11, which is larger than the 1st substrate 1 and 2nd substrate 2, is stuck on the opposite surface from the adhesion surfaces of the 1st substrate 1 and 2nd substrate 2 constituting the liquid crystal panel, the part of the sticking surface of the light shield frame 11 and 1st substrate 1 which projects from the 1st substrate 1 is adhered to the package 7, and the package 7 comes into direct mechanical contact with neither the 1st substrate 1 and 2nd substrate 2.



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CLAIMS

[Claim(s)]

[Claim 1] The common electrode formed in the 1st substrate, and the liquid crystal panel which comes to pinch a liquid crystal layer in the opposite gap of the drive electrode formed in the 2nd substrate, The package which consists of frame material which constitutes the cavity section which carries out hold maintenance of this liquid crystal panel, And it has the flexible printed circuit board which supplies the signal level for image display which connected with said common electrode and the drive electrode in 1 side side of said liquid crystal panel, and used the other end as the free end. While sticking a larger protection-from-light frame than said 1st substrate and 2nd substrate on the field where the adhesion side with the 2nd substrate of the 1st substrate which constitutes said liquid crystal panel is opposite It is the liquid crystal display component characterized by having come to paste [said package] the field which overflowed the 1st substrate concerned of a lamination side with said 1st substrate of this protection-from-light frame, and making said 1st substrate and 2nd substrate of said liquid crystal panel into the structure where it does not contact directly mechanically from said package.

[Claim 2] The common electrode formed in the 1st substrate, and the liquid crystal panel which comes to pinch a liquid crystal layer in the opposite gap of the drive electrode formed in the 2nd substrate, The package which consists of frame material which constitutes the cavity section which carries out hold maintenance of this liquid crystal panel, And it consists of flexible printed circuit boards which supply the signal level for image display which connected with said common electrode and the drive electrode in 1 side side of said liquid crystal panel, and used the other end as the free end. While sticking a larger protection-from-light frame than said 1st substrate and 2nd substrate on the field where the adhesion side with the 2nd substrate of the 1st substrate which constitutes said liquid crystal panel is opposite The liquid crystal display component characterized by coming to paste [said package] the field which overflowed the 1st substrate concerned of a lamination side with said 1st substrate of this protection-from-light frame, and coming to carry out the hermetic seal of the inside of the cavity of said package with the metal plate adhered to the adhesion side and the opposite side of said protection-from-light frame.

[Claim 3] The liquid crystal display component according to claim 1 or 2 characterized by the adhesion side of said 1st substrate and said package of said frame material being the same field which does not have a break at the perimeter of said cavity section.

[Claim 4] The liquid crystal display component according to claim 1 or 2 characterized by making it curve near said 1 one end of said flexible printed circuit board within said cavity, and coming to pull out said free end side outside from the tooth back of said package.

[Claim 5] The liquid crystal display component according to claim 2, 3, or 4 characterized by providing the heat dissipation sheet made to intervene between the 2nd substrate of said liquid crystal panel in the cavity of said package, and said metal plate.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the liquid crystal display component which started the liquid crystal display component, especially raised moisture resistance and thermal shock resistance.

[0002]

[Description of the Prior Art] The liquid crystal display component is widely used as the monitor of information machines and equipment, such as a television set and a personal computer, and other devices for [various] image display devices. Moreover, the projection [which made the liquid crystal display component the image generation means] mold display which is small and can display a big screen has also spread.

[0003] The liquid crystal display component used for a liquid crystal display consists of liquid crystal panels which pinched and constituted the liquid crystal layer in the gap which each electrode forming face with the substrate (the 2nd substrate) of another side which while formed the common electrode and formed the drive electrode used as a substrate (the 1st substrate), and the electric supply electrode for pixel selection or the electric supply electrode of a switching element is made to counter, and was stuck.

[0004] In both the liquid crystal panels of a direct viewing type, the drive circuit board and a back light (light source) have been arranged at the periphery and the rear face, it considered as the liquid crystal display component, using transparence plates, such as glass, as the above 1st and the 2nd substrate, and the configuration which observes the image formed in the liquid crystal panel on the field of the 1st substrate is adopted.

[0005] On the other hand, the liquid crystal display component used for a projection mold liquid crystal display observes the image on which the transmitted light or the reflected light was controlled by the image generated to the small liquid crystal panel, the controlled light was projected on the screen by the incident light study system, and it was projected on the screen.

[0006] The format which illuminates both the 1st substrate with which this kind of projection mold liquid crystal display constitutes that liquid crystal panel, and the 2nd substrate from the tooth back of the 2nd substrate using the liquid crystal module used as the transparence substrate, The 1st substrate is used as a transparence substrate, and what pinched the liquid crystal layer or the polymer dispersed liquid crystal layer in both lamination gap is contained in a package using a silicon substrate opaque as the 2nd substrate, it considers as a liquid crystal display component, and the reflex type which irradiates the illumination light from the 1st substrate side is known.

[0007] Moreover, it is made to perform supply of the driver voltage to the liquid crystal panel which constitutes the liquid crystal display component etc. through a flexible printed circuit board, a drive circuit apparatus, light equipment, an incident light study system, etc. are included in a housing, and equipment really consists of above-mentioned projection mold liquid crystal displays.

[0008] Drawing 7 is an explanatory view of the example of structure of the conventional liquid crystal display component used for a projection mold liquid crystal display etc., and the sectional view where (a) met the plan and (b) met the A-A line of (a) is shown.

[0009] In this drawing, 1 is the 1st substrate, makes a transparence glass plate suitable and also calls it a common substrate or a common substrate. And 2 is the 2nd substrate and also calls it a drive substrate or a silicon substrate. The liquid crystal layer 3 is pinched between these 1st substrates 1 and the 2nd substrate 2, the perimeter of both substrates is closed with a seal 4, and a liquid crystal panel is constituted.

[0010] 7 is the package of the shape of a frame which constitutes the cavity which holds a liquid crystal panel, and pastes up the field which overflowed the 2nd substrate 2 of the 1st substrate 1 with adhesives 6 on the step formed in the wall of a package 7.

[0011] 8 is an insertion member and is inserted in the upper limit of the metal plate 10 which is a heat sink, and the 2nd substrate of a liquid crystal panel. Moreover, the heat dissipation sheet 9 is inserted between the tooth back of a liquid crystal panel, and a metal plate 10.

[0012] 11 is the protection-from-light frame which makes a glass plate suitable, and pastes up the lower limit and both sides on the spacer 12 installed in the top face of the frame-like object which constitutes a package 7, and the upper limit of the frame-like object concerned with adhesives 14, respectively. This spacer 12 covers the flexible printed circuit board 5 linked to the electrode currently formed in the part which overflowed the 1st substrate of the 1st substrate of a liquid crystal panel, and is installed. In addition, a flexible printed circuit board 5 is pasted up on the edge of the 1st substrate 1 of a liquid crystal panel, and the 2nd substrate 2 with adhesives 6.

[0013] With this structure, without fixing the 2nd substrate 2 to a package 7 for a liquid crystal panel, it is fixed only to the 1st substrate 1 and the 1st substrate 1 is being fixed to the spacer 12 through the protection-from-light frame 11.

[0014]

[Problem(s) to be Solved by the Invention] With the above-mentioned conventional liquid crystal display component, the field where the 1st substrate 1 which constitutes the liquid crystal panel overflowed the 2nd substrate 2 is pasted up on the package 7. The extension of a transparent electrode is formed in this overflowing field.

[0015] It is desirable to use what the **** multiplier fabricated as a package 7 on the other hand with the small ingredient near glass (a coefficient of thermal expansion is $3.8 \times 10^{-6}/\text{degreeC}$), and the demand that he wants to use what carried out mold shaping by LPC (a liquid crystal polymer and a coefficient of thermal expansion are $2 \times 10^{-6}/\text{degreeC}$) which contained the carbon filler as the ingredient is made.

[0016] In the thing using this LPC, there was a problem of a package 7 and the transparent electrode of the 1st substrate 1 short-circuiting, and raising a poor product since the fiber-like carbon filler has projected in the shape of [detailed] a mustache in the front face of a package 7.

[0017] Moreover, the field which pastes up the protection-from-light frame 11 of a package is divided into the body and spacer 12 of a package 7 instead of the same flat surface. Therefore, an adhesion side did not turn into a uniform field, but stress concentrated on the body of a package 7, and the boundary of a spacer 12 by the spalling test, and there was a problem that the crack of adhesives and the crack of the protection-from-light frame 11 or a package occurred.

[0018] Furthermore, although adhesives 6 are filled up with the above-mentioned conventional liquid crystal display component into the clearance (about 0.2mm) between the protection-from-light frame 11 and a package 7 and the hermetic seal is performed with it, the top where the moisture permeation cross-sectional area of the seal section is large, the concordance of the protection-from-light frame 11 and package 7 which are adhesives 6 and an adapter-ed is bad, and tends to carry out moisture permeation by the adhesion interface.

[0019] And further, since insert molding of the metal plate 10 was carried out to the tooth back of a package 7, moisture needed to invade in the cavity of a package 7 through the interface with a liquid crystal polymer (LPC), the seal of this part needed to be carried out with adhesives, and there was a problem of ** that a production process increased.

[0020] In addition, with the conventional liquid crystal display component, there were many components mark to constitute, and they could not reduce an assembly routing counter, but had become the hindrance of cost reduction.

[0021] The purpose of this invention is to solve many problems of the above-mentioned conventional technique, improve shock resistance and moisture resistance, and offer low cost and a reliable liquid crystal display component.

[0022]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention was replaced with the conventional specification which pastes up the 1st substrate which constitutes the liquid crystal panel concerned on a package as a configuration which carries a liquid crystal panel in a package, and was made into the specification which pastes up on a package the part which pasted up the protection-from-light frame on the liquid crystal panel previously, and was protruded from the 1st substrate or the 2nd substrate of a protection-from-light frame.

[0023] It becomes the structure where the 1st substrate which constitutes a liquid crystal panel, and a package do not contact directly, by this, even if it uses the package made [with a package] from LCP containing a carbon filler, there is no inter-electrode short circuit currently formed in the 1st substrate, therefore the liquid crystal polymer of carbon filler content can be used as mold material of a package.

[0024] Moreover, this invention is having considered as the structure which pulls out a flexible printed circuit board from the tooth back of a package, and the adhesion side of the protection-from-light frame of a package can be made into a uniform field without a break, concentration of thermal stress does not take place to boundary parts to a package like before, such as a protection-from-light frame and a spacer, and it can avoid the crack of the adhesives of the part concerned, a protection-from-light frame, and a package etc.

[0025] Furthermore, this invention applied the adhesives for performing adhesion with a protection-from-light frame and a package to jointing of a package or a protection-from-light frame, and while considering as the structure which pushes a protection-from-light frame against a package, and is fixed, it carried out as the structure which presses the metal plate which is a heat sink from the tooth back of a package through a heat dissipation sheet, and carries out adhesion immobilization to a package. And it considered as the structure which pulls out the flexible printed circuit board which was being pulled out from between the top face of a package, and spacers from between metal plates at the tooth back of a package conventionally. In addition, between this flexible printed circuit board, a package, and metal plates is pasted up with adhesives.

[0026] While being able to use the package of mold shaping using the carbon content LCP by having considered as this structure, the moisture permeation between the metal plates and packages which are the heat sink installed in a tooth back can be prevented.

[0027] It will be as follows if the typical configuration of the liquid crystal display component by this invention is described. Namely, the common electrode formed in the (1) 1st substrate and the liquid crystal panel which comes to pinch a liquid crystal layer in the opposite gap of the drive electrode formed in the 2nd substrate, The package which consists of frame material which constitutes the cavity section which carries out hold maintenance of this liquid crystal panel, And it consists of flexible printed circuit boards which supply the signal level for image display which connected with said common electrode and the drive electrode in 1 side side of said liquid crystal panel, and used the other end as the free end. While sticking a larger protection-from-light frame than said 1st substrate and 2nd substrate on the field where the adhesion side with the 2nd substrate of the 1st substrate which constitutes said liquid crystal panel is opposite It comes to paste [said package] the field which overflowed the 1st substrate concerned of a lamination side with said 1st substrate of this protection-from-light frame, and said 1st substrate and 2nd substrate of said liquid crystal panel are characterized by considering as the structure where it does not contact directly mechanically from said package.

[0028] By this configuration, the package of mold shaping using the carbon content LCP can be used,

moisture permeation is controlled, and the crack of the protection-from-light frame in a spalling test, a package, and adhesives is avoided.

[0029] (2) The common electrode formed in the 1st substrate, and the liquid crystal panel which comes to pinch a liquid crystal layer in the opposite gap of the drive electrode formed in the 2nd substrate, The package which consists of frame material which constitutes the cavity section which carries out hold maintenance of this liquid crystal panel, And it consists of flexible printed circuit boards which supply the signal level for image display which connected with said common electrode and the drive electrode in 1 side side of said liquid crystal panel, and used the other end as the free end. While sticking a larger protection-from-light frame than said 1st substrate and 2nd substrate on the field where the adhesion side with the 2nd substrate of the 1st substrate which constitutes said liquid crystal panel is opposite It is characterized by having come to paste [said package] the field which overflowed the 1st substrate concerned of a lamination side with said 1st substrate of this protection-from-light frame, and carrying out the hermetic seal of the inside of the cavity of said package with the metal plate adhered to the adhesion side and the opposite side of said protection-from-light frame.

[0030] By having considered as this configuration, in addition to the effectiveness of the above (1), the part which pulls out a flexible printed circuit board does not take a spacer like before, but the number of components is reduced, and low cost-ization is attained.

[0031] In (3), (1), or (2), the adhesion side of said 1st substrate and said package of said frame material is characterized by considering as the same field which does not have a break at the perimeter of said cavity section.

[0032] By this configuration, an adhesion side becomes uniform from the first, concentration of thermal stress is avoided, and the effectiveness of the above (1) and (2) can secure high dependability.

[0033] In (4), (1), or (2), it is made to curve near said 1 one end of said flexible printed circuit board within said cavity, and is characterized by coming to pull out said free end side outside from the tooth back of said package.

[0034] By having considered as such a configuration, in addition to the effectiveness of the above (3), the cash-drawer structure of a flexible printed circuit board can be simplified, and simplification of moisture permeation prevention and a production process is attained.

[0035] It is characterized by having set to (5), (2), (3), or (4), and providing the heat dissipation sheet made to intervene between the 2nd substrate of said liquid crystal panel in the cavity of said package, and said metal plate.

[0036] With this configuration, as a heat dissipation sheet, heat conductivity is high and maintenance of a liquid crystal panel and overheating of a liquid crystal display component are prevented by using the ingredient which has elasticity.

[0037] In addition, it cannot be overemphasized that various polarization is possible, without not limiting this invention to the above-mentioned configuration, and deviating from the technical thought of this invention.

[0038]

[Embodiment of the Invention] Hereafter, with reference to the drawing of an example, it explains to a detail about the gestalt of operation of this invention.

[0039] Drawing 1 is the explanatory view of the 1st example of the liquid crystal display component by this invention, and the sectional view where (a) met the plan and (b) met the A-A line of (a) is shown. Moreover, drawing 2 is rear view and drawing 3 is the enlarged drawing of D part of drawing 1 (a).

[0040] And drawing 4 is a decomposition perspective view which explains further ***** of the 1st example of the liquid crystal display component by this invention.

[0041] In drawing 1 - drawing 3 , a liquid crystal panel pinches the liquid crystal layer 3 between the 1st substrate 1 and the 2nd substrate 2, and closes and consists of seals 4. The 1st substrate 1 consists of transparence glass plates, and the common electrode is formed in the inside. Moreover, the 2nd substrate 2 consists of opaque silicon plates, and an active component and various kinds of electrodes,

such as a thin film transistor, are formed in the inside. These electrodes are pulled out by the part which overflowed the opposite substrate, and are connected with the supply terminal of the driving signal for image display, and the carried drive IC.

[0042] And it connects with a flexible printed circuit board 5 through the anisotropy electric conduction adhesives (ACF) 15 into the field which overflowed the 1st substrate 1 of the 2nd substrate 2.

Connection with the common electrode currently formed in the 1st substrate is made through the anisotropy electric conduction adhesion prepared in the necessary part between the 1st substrate 1 and the 2nd substrate 2, or is performed by carrying out direct continuation of the conductor of a flexible printed circuit board. Here, it has considered as the former configuration.

[0043] In addition, the adhesives 6 in drawing 3 have the function to reinforce the connection of a flexible printed circuit board 5 and a liquid crystal panel.

[0044] The top face of the 1st substrate 1 of a liquid crystal panel is covered by the protection-from-light frame 11. This protection-from-light frame 11 consists of glass plates which have opaque partial 11a on the periphery of the service area (a dotted line shows among drawing) of a liquid crystal panel, and has the function which fixes a liquid crystal panel to a package 7 with the function to perform optical electric shielding which protects the electronic-circuitry sections, such as the drive IC carried around a liquid crystal panel, from light.

[0045] Since the top face of the frame of the package 7 on which the protection-from-light frame 11 is pasted up is the uniform flat surface where a break does not have the whole contact side surface with the protection-from-light frame 11 concerned, the stress resulting from the configuration expansion difference of the ingredient in a spalling test is distributed, and neither the crack of adhesives nor the crack initiation of a protection-from-light frame or a package 7 occurs.

[0046] The protection-from-light frame 11 has the magnitude protruded from the 1st substrate 1 of a liquid crystal panel, and pastes up this overflowing field on the top face of the frame of a package 7 with adhesives 14. Then, with a metal plate (heat sink) 10, the 1st substrate 1 of a liquid crystal panel presses a liquid crystal panel, and the heat dissipation sheet 9 inserted in the tooth back of the 2nd substrate 2 is stuck on the glass plate inside of a protection-from-light frame. Therefore, not both packages have the part which the 1st substrate which constitutes a liquid crystal panel, and the 2nd substrate contact directly.

[0047] The flexible printed circuit board 5 connected to the liquid crystal panel curves to the tooth-back side of a package 7 near the connection with the liquid crystal panel concerned; and is pulled out outside from the upper part of a frame. In the free end of this flexible printed circuit board 5, it has connector area 5a for connecting with the source of a picture signal.

[0048] The metal plate (heat sink) 10 installed in the tooth back of a package 7 makes a flexible printed circuit board 5 placed between the up frames of a package 7, and is pasted up and fixed to them with adhesives 16 with a lower frame and a both-sides frame. At this time, a metal plate 10 is fixable to a flat surface because only the amount of [of a flexible printed circuit board 5] thickness makes thin the adhesion side of the up frame of a package 7. Moreover, the amount of [of the flexible printed circuit board 5 of a metal plate 10 concerned] interstitial segment may be made to bulge in the method of outside.

[0049] By immobilization of this metal plate 10, as described above, the heat dissipation sheet 9 inserted inside the metal plate 10 concerned presses the 2nd substrate 2 of a liquid crystal panel in the protection-from-light frame 11 direction, and a liquid crystal panel holds inside the cavity of a package 7. Thereby, a liquid crystal panel does not contact a package 7 directly.

[0050] It does not generate but moisture permeation is also avoided, and the crack of a configuration member which was described above by this even when using it, having included in the liquid crystal projector, and the inter-electrode short circuit of a liquid crystal panel can be *(ed) if high dependability is acquired. Moreover, the liquid crystal display component of this example has few components mark of the configuration member, and low cost is attained.

[0051] Next, the outline is explained about the display-action principle of the liquid crystal panel used for the liquid crystal display component of this example, and an example of the liquid crystal projector incorporating the liquid crystal display component by this example.

[0052] Drawing 5 is a mimetic diagram explaining the principle of the display action of a liquid crystal panel which used the polymer dispersed liquid crystal, (a) shows a non-display condition and (b) shows a display condition.

[0053] Three change to the condition of penetrating from the condition that are the polymer dispersed liquid crystal (PDLC) which distributed liquid crystal molecule 3a, and light is scattered about according to applied voltage into a macromolecule matrix, among drawing.

[0054] As transparent electrode 1A whose thin film transistor TFT and reflective pixel electrode 2A which are a switching element are a common electrode at the 1st substrate 1 is formed in the 2nd substrate 2 and it is shown in (a) In the condition of (a) which is not impressing the electrical potential difference between transparent electrode 1A of the 1st substrate 1, and reflective pixel electrode 2A of the 2nd substrate 2, liquid crystal molecule 3a is arranged in the respectively irregular direction, and incident light Lin is scattered about in the liquid crystal layer 3. Lsc shows the scattered light.

[0055] On the other hand, as shown in this drawing (b), where an electrical potential difference is impressed by selection of a thin film transistor TFT between transparent electrode 1a of the 1st substrate 1, and reflective pixel electrode 2A of the 2nd substrate 2, liquid crystal molecule 3a carries out orientation in the fixed direction. In this condition, incident light Lin penetrates the liquid crystal layer 3, without being scattered about, reaches reflective pixel electrode 2A, is reflected regularly by this reflective pixel electrode 2A, and this reflected light carries out outgoing radiation from the 1st substrate 1. Lout This reflected light is shown.

[0056] An image is displayed using this principle of operation by choosing reflective pixel electrode 2A by the thin film transistor TFT which is a switching element.

[0057] Drawing 6 is a mimetic diagram for explaining the example of a configuration of the liquid crystal projector using the liquid crystal display component explained by drawing 5 . It comes to contain the liquid crystal display component 21, the source 22 of the illumination light, the lighting lens system 23, a reflecting mirror 24, the image formation lens system 25, the optical diaphragm 26, and incident light study system 27 grade in a housing 20.

[0058] Incidence of the exposure light from light equipment 22 is carried out to the front face of liquid crystal panel 21A which constitutes the liquid crystal display component 21 with the lighting lens system 23 and a reflecting mirror 24. The electronic image which makes incident light transparency or un-penetrating corresponding to a picture signal is generated by the effective viewing area of liquid crystal panel 21A, the light which carried out incidence to liquid crystal panel 21A with this electronic image is modulated, and expansion projection of the reflected light is carried out on a screen 28 through the image formation lens system 25, and the optical diaphragm 26 and the incident light study system 27. In addition, in order to make it intelligible, the image formation lens system 25 and a liquid crystal display component are separated, and it has illustrated here.

[0059] In addition, although the above-mentioned example explained the reflective mold liquid crystal display component which used the polymer dispersed liquid crystal layer, this invention is applicable also like the liquid crystal display component using a liquid crystal layer with other presentations.

[0060]

[Effect of the Invention] Since the package which carried out mold shaping by the liquid crystal polymer (LCP) in which the coefficient of thermal expansion contained the carbon filler which the component and coefficients of thermal expansion of a liquid crystal display component, such as the 1st substrate, the 2nd substrate, and a protection-from-light frame, approximated small can be used according to this invention as explained above, stress for jointing of the component concerned by the differential thermal expansion of each component cannot occur easily, and the poor display by the abnormalities in a cel gap of the liquid crystal layer of a liquid crystal panel is prevented.

[0061] Moreover, since the protection-from-light frame adhesion side of a package is a uniform flat surface without a break, the stress concentration for jointing of the component concerned by the differential thermal expansion of each component is controlled, the crack of each component in jointing and the crack of adhesives can be avoided, generating of a poor product is prevented, and a spalling test can also offer a reliable liquid crystal display component.

[0062] Furthermore, according to this invention, since a break does not have the protection-from-light frame adhesion side of a package, even if it lessens the amount of the adhesives on which a protection-from-light frame and a metal plate are pasted up, sufficient adhesion is possible, a glue line can make it thin, moisture cannot enter easily in the cavity of a package through adhesives or an adhesion interface, and the humidity-tolerant reliability of a product also improves sharply.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view of the 1st example of the liquid crystal display component by this invention.

[Drawing 2] It is the rear view of the 1st example of the liquid crystal display component by this invention.

[Drawing 3] It is the enlarged drawing of D part of drawing 1 (a).

[Drawing 4] It is the decomposition perspective view which explains further ***** of the 1st example of the liquid crystal display component by this invention.

[Drawing 5] It is a mimetic diagram explaining the principle of the display action of the liquid crystal panel using a polymer dispersed liquid crystal.

[Drawing 6] It is a mimetic diagram for explaining the example of a configuration of the liquid crystal projector using the liquid crystal display component explained by drawing 5.

[Drawing 7] It is the explanatory view of the example of structure of the conventional liquid crystal display component used for a projection mold liquid crystal display etc.

[Description of Notations]

1 1st Substrate

2 2nd Substrate

3 Liquid Crystal Layer

4 Seal

5 Flexible Printed Circuit Board

5a Connector area

6 16 Adhesives

7 Package

9 Heat Dissipation Sheet

10 Metal Plate (Heat Sink)

11 Protection-from-Light Frame

11a Opaque part

15 Anisotropy Electric Conduction Adhesives

17a, 17b, 17c Set-screw hole.

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